Data Used in the Clean Water Action Plan Unified Watershed Assessment

Name of Data Layer: **Estuarine Benthic Index of Biotic Integrity- Status index**

Definition (General Description): Benthic communities are sampled at 18 fixed sites in Maryland tidal tributaries. The Chesapeake Bay Benthic Index of Biotic Integrity (B-IBI) evaluates whether the benthic community at a site meets the Restoration Goals, scoring on measures of species diversity, species composition, productivity, and trophic composition (Ranasinghe et al. 1997). Un-impacted reference site attributes were used to define Restoration Goals scales for each type of benthic habitat found in the Chesapeake Bay with the exception of the tidal fresh habitat. Specific numerical ranges are established for three categories for each criteria measured: scores are based on whether the community approximates (a score of 5), deviates slightly from (a score of 3) or deviates strongly from (a score of 1) the characteristics of the attribute at the best reference sites (Weisburg et al. 1997).

Data Source: Maryland Department of Natural Resources Benthic Monitoring Program

Data Type: Condition__X__ Stressor _____ Vulnerability _____ Trend _____ Growth _____
          Other For some watersheds, the index score is an extrapolated value

Method of Calculation: Un-impacted reference site attributes were used to define Restoration Goals scales for each type of benthic habitat found in the Chesapeake Bay with the exception of the tidal fresh habitat. Specific numerical ranges are established for three categories for each criteria measured: scores are based on whether the community approximates (a score of 5), deviates slightly from (a score of 3) or deviates strongly from (a score of 1) the characteristics of the attribute at the best reference sites (Weisburg et al. 1997). These individual attribute scores are then averaged to determine the B-IBI. Communities with a B-IBI of 3.0 or greater are classified as meeting the Restoration Goals, sites with B-IBIs greater than 2.6 but less than 3.0 are classified as marginal, sites with B-IBIs from 2 to 2.6 are classified as degraded, and sites with B-IBIs less than or equal to 2 are classified as severely degraded. Status is defined as the overall current (most recent three years) B-IBI score for each station. For the INRA/UWA project, Benthic IBI current status were assessed to provide a score on the scale from 1 (most severely degraded) to 10 (meets goals-highest quality). A mean of the BIBI status INRA/UWA scores was calculated by station. For 8-digit watersheds that included more than one station, these means by station were then averaged to determine the watershed mean (which is the same as the overall index mean when only one station is in an 8-digit watershed). Finally, these 8-digit watershed means were averaged within larger drainage basins (for the Potomac, Patuxent and Choptank Rivers). From this last step, multiple 8-digit watersheds are given the same overall index INRA/UWA score to reflect the interactions of watersheds upstream and downstream of each other within a tributary. See "Methods used for Tidal Water Quality, SAV, Benthic IBI and Fish IBI data consolidation for the INRA/UWA project" for more information.

For the UWA, watersheds are placed in Category I (needs restoration) if they are scored less than

6 (does not meet goals). Watersheds are placed in Category II (needs preventative action) if they have scores greater than or equal to 6 (meets goals). Because no system is considered to be pristine, none of the watersheds are placed in Category III (pristine watersheds).

Watershed Scale: Tributary Strategy Region[1] _____ USGS 8 Digit _____ MD 6 Digit _____ MD 8 Digit __X__ MD 12 Digit _____ Adaptable to Any Scale _____Other _____

Data Custodian: Tidewater Ecosystem Assessments/RAS/DNR

Clean Water Goal: Yes _____ No __X__
        If Yes: Description of Goal _____

Other Natural Resource Goal: Yes __X__ No _____
        If Yes: Benchmark Goal __X__ Relative Goal ___
        If Benchmark Goal - Description of Benchmark Estuarine Benthic Index of Biotic Integrity Chesapeake Bay Restoration Goals

Assumptions _____
_____

Comments: We assigned INRA/UWA scores to the Benthic IBI status in such a way as to maintain the qualitative information applied to Benthic IBI scores for the purposes of the Chesapeake Bay Program. While this seems to be a good first approximation for the purposes of this "preliminary" assessment (expecting that we will continue to refine the INRA/UWA process), additional information may be useful for future attempts (e.g. linkages between Benthic IBI and low dissolved oxygen concentrations).

References: see "Methods used for Tidal Water Quality, SAV, Benthic IBI and Fish IBI data consolidation for the INRA/UWA project" for more information.

Ranasinghe, J. A., L. C. Scott, F. S. Kelley (1997) Chesapeake Bay Water Quality Monitoring Program Long-term Benthic Monitoring and Assessment Component Level 1 Comprehensive Report (July 1984- December 1996). Maryland Department of Natural Resources. Annapolis, Maryland. 46 p.

Weisburg, S.B., J.A. Ranasinghe, D.M. Dauer, L.C. Schaffner, R.J. Diaz, and J.B. Frithsen. 1997. An estuarine benthic index of biotic integrity (B-IBI) for Chesapeake Bay. Estuaries. 20(1): 149-158.

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[1]The Youghiogeny watershed and the Coastal Bays region are considered to be Tributary Strategy Regions for the purposes of this program